

REMARKS

Reconsideration of the present application is respectfully requested. Claims 1-29 have been canceled. Claims 30-61 have been newly added. No new matter has been added.

Claim Rejections - §112

Claims 1-29 stand rejected under 35 USC §112, second paragraph, as being indefinite. Specifically, the Examiner alleges that the claim limitation “zombie filespace not accessible to users” renders the claim indefinite because it was an attempt to claim the invention by excluding what the inventors did not invent rather than distinctly and particularly pointing out what the inventors did invent. Although claims 1-29 have been canceled, the newly added claims contain such a limitation. Thus, Applicants respectfully traverse the rejections and present the following response.

The current view of the courts is that there is nothing inherently ambiguous or uncertain about a negative limitation. So long as the boundaries of the patent protection sought are set forth definitely, albeit negatively, (i.e., as long as what Applicants regard as their invention is clear) the claim complies with the requirements of 35 USC §112, second paragraph. MPEP 2173.05(i).

The claim limitation “the zombie filespace not accessible to users” refers to a filespace to which a user has no access. This language is not an attempt to exclude “what the inventors did not invent”, rather, it is simply one characteristic of the overall claimed invention. Thus, the meaning and the boundaries defined by the limitation is clear and definite. The limitation does not render the whole claim language indefinite.

Thus, the limitation “the zombie filesystem not accessible to users” meets the requirement set forth by 35 USC §112, second paragraph.

The Examiner also rejected claims 1-29 based on 35 USC §112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner alleges that the claimed feature of “zombie filesystem not accessible to users”, “breaking links associating disk blocks” and “dynamically growth” are not described in the specification to meet the enablement requirement.

Regarding the written description issue, the Examiner is directed to page 10, lines 1-3 of the specification, which defines “zombie filesystem” as “a portion of the file system where files are not available to users in normal operation, but can still be manipulated by the file system as if they were normal files.” The Examiner is also directed to page 19, lines 13-14 of the specification, which states “the zombie file deletion manager 122 starts deleting portions of the file 240 by terminating block links 242 at the outer leaves of the file tree.” Regarding the phrase of “dynamically growth”, because the newly added claims do not include such a phrase, this issue is moot. However, the newly added claims include the feature of “increasing the size of the zombie filesystem”. Supporting disclosure of such claimed feature may be found on page 18, lines 9-21.

Claim Rejections - §101

The present invention generally relates to a method of maintaining reliable file system consistency. As explained in the specification, a fundamental requirement of a reliable file system is that the state of the file system recorded on non-volatile storage must reflect only

completed file system operations. However, some operations such as deleting or truncating an extra large file would take a very long period of time, interfering with the execution a scheduled consistency checkpoint. According to the method disclosed in the present application, an extra large file or a portion of the file (in case of truncating) is moved from a live filesystem to a zombie filesystem to take advantage of the faster speed of moving operations compared with deleting operations. Because the zombie filesystem is not accessible to users, the file would appear deleted or truncated to a user after the file or the portion of the file is moved from the live filesystem to the zombie filesystem. Then, the file or the portion of the file is deleted in a piece by piece fashion so as not to interfere with the execution of a scheduled consistency checkpoint. In addition, any changes of the live filesystem and the zombie filesystem caused by the moving and deleting are recorded in a log file in a persistence memory so that the changes may be replayed later in response to a recovery from a crash of the file system. With the above comments, the attention is directed to the newly added claim 30.

30. A method comprising:
maintaining a file system that includes a live filesystem accessible to users and a zombie filesystem not accessible to users;
in response to a request to delete at least a portion of a file stored in the live filesystem, moving blocks storing said portion of the file from the live filesystem to the zombie filesystem and deleting at least some of the blocks from the zombie filesystem before a scheduled consistency checkpoint of the file system;
recording said moving and deleting in a persistent memory; and
in response to a crash of the file system, replaying said moving and deleting based on information stored in the persistent memory to recover the file system.
(Emphasis added)

The above emphasized limitation recites a practical application of the invention, which produces a concrete, useful and tangible result, namely, recover a file system from a crash. Thus, it is believed that claim 30 meets the requirement set forth by 35 USC §101. Other newly added

independent claims all recite limitations similar to that discussed above for claim 30. For similar reasons, all other claims meet the requirement of §101.

Response to Examiner's Remark

The Examiner alleges, in the remark section of the office action mailed on 7/20/06, that the limitation “a zombie filesystem [not] accessible to users to which at least some blocks of a file can be moved” is not disclosed in the specification. Regarding “a zombie filesystem not accessible to users”, the Examiner’s attention is directed to Applicants’ discussion presented above. Regarding “to which (the zombie filesystem) at least some blocks of a file can be moved”, the Examiner is directed to line 19 of page 21 through line 3 of page 22 of the specification, where moving some blocks of a file from the live filesystem to an evil twin file in a zombie filesystem is discussed. Applicants also respectfully submit that techniques of moving file blocks from one place to another place are well known in the art. Thus, the specification meets the enablement requirement of 35 USC §112.

Claims Rejections - §102

The Examiner rejects claims 1-29 based on Hitz (article entitled “File System Design for an NFS file server appliance”). Although claims 1-29 have been canceled in this response, Applicants nevertheless present the following explanation regarding the newly added claims in view of Hitz.

Independent claim 30 recites:

30. A method comprising:
maintaining a file system that includes a live filesystem accessible to users and a **zombie filesystem not accessible to users**;

**in response to a request to delete at least a portion of a file stored in the live
filesystem, moving blocks storing said portion of the file from the live filesystem to the
zombie filesystem and deleting at least some of the blocks from the zombie filesystem
before a scheduled consistency checkpoint of the file system;
recording said moving and deleting in a persistent memory; and
in response to a crash of the file system, replaying said moving and deleting based
on information stored in the persistent memory to recover the file system.**
(Emphasis added).

Hitz discloses a method of creating Snapshots in a WAFL (Write Anywhere File Layout)
file system. Hitz, however, does not teach or suggest the above emphasized limitations in
combination, namely, moving at least some blocks of a file from a live filesystem accessible to
users to a zombie filesystem not accessible to users, deleting the blocks from the zombie filesystem,
and recording the moving and deleting in a persistent memory.


Thus, at least for the foregoing reasons, claim 30 and all claims which depend on it are
patentable over Hitz. All other independent claims recite limitations similar to those discussed
above for claim 30, therefore all other claims are also patentable over Hitz.

For the foregoing reasons, the present application is believed to be in condition for
allowance, and such action is earnestly requested.

If any additional fee is required, please charge Deposit Account No. 02-2666.

Respectfully submitted,
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